

anterior cicatrices smooth, well-impressed and distant; posterior cicatrices slightly impressed, smooth and confluent; naere pale blue, white or coppery. Width, $2\frac{5}{8}$; length, $1\frac{3}{8}$; diameter, $\frac{9}{16}$ inches.

Habitat: Spring Creek, Decatur Co., Ga.

Type lot in National Museum.

Remarks: Affinity, *Unio scannatus* Morel. The roughness of the surface of this singular shell is the one feature that at once arrests attention. We know of no other U. S. species of this class (as to outline) that possesses such a surface. It is not, however, so conspicuously furrowed as its affinity.

AN ATTEMPT TO DEFINE THE NATURAL GROUPS OF STROMBS.

BY GEO. HALCOTT CHADWICK.

Having recently had the privilege of studying a fine series of the living species of *Strombus*, *Pterocera* and *Terebellum*, the opportunity seemed favorable for a critical examination of the entire group. As I am not aware that any similar attempt has been made to revise the Strombi, the results obtained are respectfully submitted to the scientific world. Lacking anatomical data, I have freely used neglected and sometimes indefinable features of the shells as guides to their inter-relationships. Forced to recognize some new groups, I have left the secondary matter of names to those more skilled in nomenclature, but have indicated the probable application of the titles already in use, as to the types of which scarcely any two authors, save Tryon and Fischer, agree.

Of the species and varieties of *Strombus* recognized in Tryon's monograph, I have seen all but *S. integer*, *taurus*, *listeri*, *dilatatus*, *labiosus*, *deformis*, *septimus*, *minimus*, *sibbaldi*, *erythrinus* (true), *pulchellus*, *helli*, *scalariformis* and *bulbulus*, although *S. goliath*, *fusiformis* and *terebellatus* were not now before me. All ten of the *Pterocerae* were at hand.

The grouping of the species which seems to me most in accordance with their natural relations, as indicated by shell features and geographical distribution, is as follows:

GROUP A (*Monodactylus*).

Canal lengthened, bent abruptly dorsally; lip with margin straightened, incurled, truncated at both ends, bearing a posterior digitation

originating *above* the shoulder angle; body regularly sculptured with spiral striæ and rows of nodules; spire elegant, high, *without varices*; suture suddenly, *vertically* ascending at aperture; columellar callus thinning rapidly, or with an impressed area, posteriorly; no conspicuous periostracum.

S. auris-dianæ, melanostomus, aratrum, australis.

Distribution: Mauritius to Japan and Polynesia.

The American forms and *tricornis*, included by Tryon, differ considerably (note the italicized passages above) from this very natural little Indo-Pacific group, and are grouped elsewhere.

GROUP B (*nov.*).

Canal *bent back*, the columellar callus *terminating below in a prominent knob*, giving a bilobed appearance; lip with the antesinual lobe *directed forward*, the outer margin inrolled and thickened, *descending* from the suture and lobed in the posterior sinus; body with *spiral rows of squarish nodules*; spire moderate.

S. papilio, lentiginosus.

Distr.: Zanzibar to Polynesia.

The wide difference between these two species and the smooth ones allied to *laciniatus* is readily seen from the above definition, while many points of resemblance with Group A will be detected, suggesting community of origin.

Sub-group B 2.

Callus prominent below, hardly knobbed; lip edge sharp, "*hooded*" posteriorly, but not lobed; spire *high*, nodular.

S. granulatus.

Panama and Galapagos.

This species, which differs utterly from all other American forms, agrees too closely in many respects with the *lentiginosus* group, and seems to form a geographically isolated section.

GROUP C (*Strombus*).

Shell large and strong; canal not much lengthened, somewhat curved or *sinuous*; lip *widely expanded*, especially above, where it is sometimes lobed; suture ascending at aperture; body spirally corded; periostracum thick and coarse, *spirally wave-striolate*.

S. gallus, gigas, goliath, costatus, integer, bituberculatus, bubonius, galeatus, peruvianus.

Distr.; American, South Carolina to Brazil, Mazatlan to Peru; West African.

I can find no reliable feature by which to separate the American "monodactyl" species (the posterior lobe, which is derived *from* the shoulder-angle and is not homologous with the digitation of the Oriental forms, being incipient in *gigas* itself), and I have detected the peculiar periostracum in all but *gallus*. Moreover in the characters of spire and body *gallus* agrees with *gigas*, *bituberculatus* with *costatus* (and has a variety corresponding with *inermis*), and *peruvianus* with *galeatus*, and this accords with their geographical range.

Sub-group C 2.

Canal short, *straight*; lip *scarcely expanded*, with margin faintly incurled, *deeply receding* at the suture, and not surmounting the shoulder of the penultimate whorl; body nearly smooth; periostracum finely, densely, vertically lamellose; inner lip spreading.

S. pugilis, gracilior.

Antillean and West Mexican.

The last clause of the definition is needed to distinguish this small American group from *Conomurex luhmanni*, which it strangely parallels. Only a conservative spirit and the occasional presence of wave-striations on the periostracum induce me to give this group secondary rank under group C.

GROUP D (*Euprotomus*).

Canal very short, with the *dorsal margin produced beyond the short tip* of the straightened columella; lip with the antesinual lobe broad, *rolled upward and inward*, the outer margin broadly and *abruptly inflected*; body with a large node; spire high, whorls nodulous.

S. laciniatus, latissimus, powderosus, taurus.

Distr.; Japan to Fiji Is.

S. tricornis. Red Sea.

The last species is aberrant in its single posterior lobe and obsolescent inflection of the lip margin, but the resemblance to *peruvianus* is evidently deceptive. *S. taurus* strikingly emphasizes the close alliance of this group to

GROUP E (*Pterocera*).

This group need not be redefined. It has the peculiar form of antesinual lobe of the preceding group, and differs mainly in the elongated canals and numerous lip-claws.

(*To be continued.*)